Aneurysm of a Peripheral Pulmonary Artery

CASE REPORT AND BRIEF REVIEW OF THE LITERATURE

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SUMMARY

A patient is presented in whom a solitary aneurysm of a peripheral pulmonary artery was treated by left lower lobectomy. This is the eighth reported successful resection of such an aneurysm.

A brief review of the literature is also presented and the importance of pulmonary arteriography in the diagnosis of this condition is mentioned.

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A 17-year-old Coloured girl was admitted to the Tygerberg Hospital on 19 July 1974, with a history of sudden collapse while playing rather vigorously with members of her family. The episode resembled a vasovagal attack with temporary loss of consciousness. She appeared pale and complained of pain of sudden onset in the left axillary region. She had an uncertain history of tuberculosis at the age of 7 years.

On examination she appeared to be a well-built young woman. She was slightly dyspnoeic and moderately anaemic. Her blood pressure was 100/60 mmHg. No clubbing of the extremities was present. The respiratory rate was 32/min with a poor exchange of air, presumably owing to the pleuritic pain. The left thoracic wall was tender in the axillary region. The left thorax was dull on percussion and the breath sounds were considerably reduced. Bronchial breathing was present above the area of reduced breath sounds. The apex beat was not palpable. In the left axillary and infrascapular regions a soft, decrescendo, holosystolic murmur of grade II - III/VI was heard, but no certain cardiac abnormality was detected. The abdomen and the central nervous system appeared normal. Chest X-ray examination showed a large amount of fluid in the left pleural cavity. The haemoglobin was 11,0 g/100 ml, the sedimentation rate 18 mm/h, and the leucocyte count 8 600/mm^3 (lymphocytes 26%; neutrophils 70%). The electrocardiogram was normal.

A presumptive diagnosis of pleural effusion with underlying pulmonary infection was made. Pleural aspiration yielded dark blood. The patient was referred to the Thoracic Surgical Unit on 20 July 1974. At this stage her haemoglobin was 9,5 g/100 ml. An intercostal tube was inserted into the left pleural cavity and 2 000 ml of dark blood was drained. She received 4 units of whole blood and her condition subsequently stabilised. The haemoglobin value after the transfusion was 14,1 g/100 ml.

The murmur previously described remained of the same intensity and its localisation did not change. A chest X-ray film at this stage showed normal expansion of the lung and complete drainage of the pleural fluid. A density was noted in the inferior lobe, overlying the cardiac shadow (Fig. 1). A diagnosis of a peripheral arterial aneurysm with arteriovenous malformation was considered at this stage. Tomograms taken of this area demonstrated a spherical density, approximately 4 - 5 cm in circumference, with a connection to a pulmonary vessel (Fig. 2). Pulmonary arteriograms (Fig. 3) demonstrated an aneurysm of a branch of the left pulmonary artery to the inferior lobe (anterior basal segment). The aneurysm filled rapidly and showed a typically delayed emptying phase.

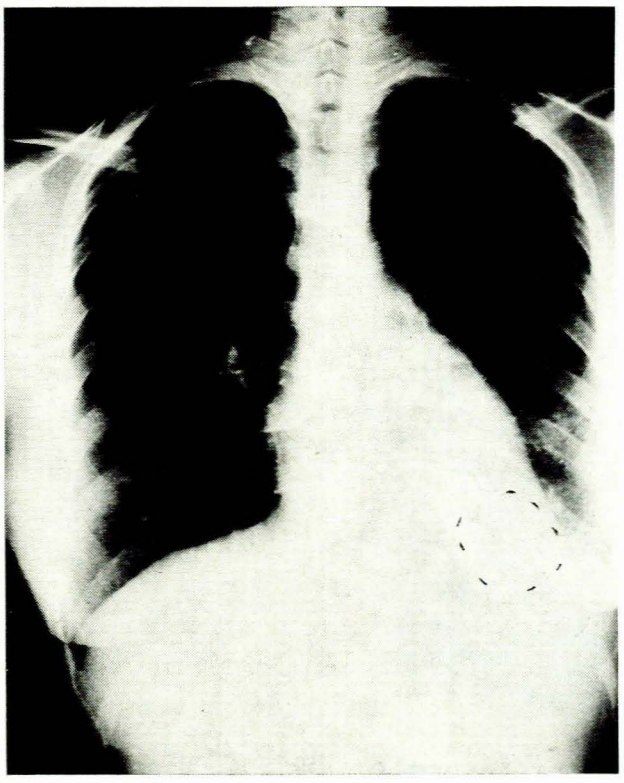

Fig. 1. Chest roentgenogram showing the circular density in the inferior left lobe underlying the cardiac shadow.

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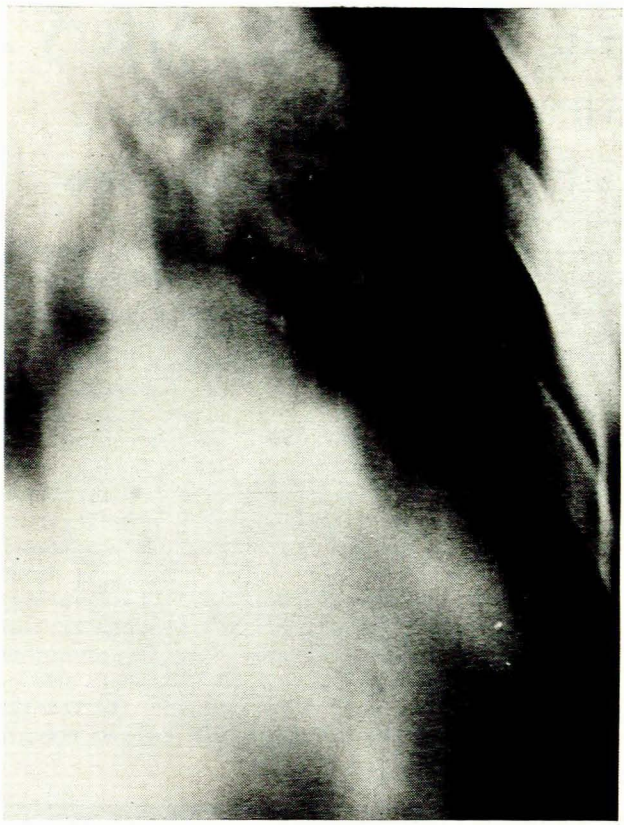

Fig. 2. Tomogram of the inferior lobe on the left showing clearly the vascular connection of the density.

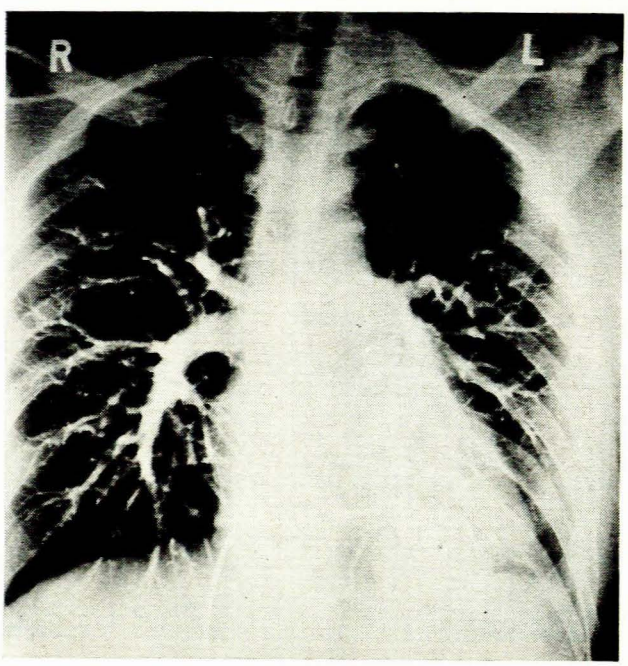

Fig. 3. Pulmonary arteriogram demonstrating the aneurysm of a branch of the pulmonary artery to the inferior lobe.

On 9 September 1974 a left thoracotomy was performed. Numerous adhesions between the inferior lobe and the diaphragmatic parietal pleura were devided. A pulsating aneurysm in the left lower lobe, bulging the inferior surface of the lobe in the region of the anterior basal segment, was demonstrated. A left lower lobectomy was carried out. On macroscopic examination the specimen revealed an aneurysm of a large peripheral segmental pulmonary artery. Drainage of the aneurysm was by two fairly large pulmonary veins.

Microscopic examination showed a thin-walled vascular aneurysm. The surrounding lung tissue showed mild, chronic infection with areas of alveolar collapse. No specific aetiology could be demonstrated and no sign of tuberculosis was found. A single sputum culture for *Mycobacterium tuberculosis*, however, was positive. Her recovery was uneventful and she remains well.

DISCUSSION

Aneurysms of a peripheral pulmonary artery are rare. In 1961 Charlton and Du Plessis,[1] in a review of the literature, found 30 cases of multiple aneurysms of segmental branches of the pulmonary artery. In 1974 Monchik and Wilkins[2] reported a case of a solitary peripheral pulmonary artery aneurysm in the right middle-lobe artery. In a careful review of the literature they found only 6 patients who had undergone successful operative removal of an aneurysm in a peripheral pulmonary artery. In their case the aetiology remained obscure. In the 6 reported cases, the aetiology was unknown in 1 case, caused by pulmonary hypertension in 2, by trauma in 2 and mycotic infection in 1 case.[2]

In our case the histological examination showed mild chronic infection in the lung tissue surrounding the aneurysm. No microscopic evidence of tuberculosis was found, and yet, as reported, one sputum culture for *M. tuberculosis* was positive. It is difficult to correlate the negative histological changes with the positive sputum culture, and the aetiology of the aneurysm in our case remains uncertain.

Factors related to the development of solitary peripheral pulmonary artery aneurysms are syphilis, tuberculosis, trauma, mycotic infections, pulmonary hypertension and congenital malformation. Syphilis may give rise to aneurysms in the main pulmonary artery, but they have been known to occur in a peripheral pulmonary artery.[3,4]

A chronic tuberculotic cavity may be associated with an aneurysm, the so-called Rasmussen aneurysm. With the decline in the incidence of pulmonary tuberculosis, and its successful treatment with drugs, this type of aneurysm has become less common. Kidd,[5] in 1884, reported 26 cases of pulmonary artery aneurysm in 230 patients dying of tuberculosis. Most of the aneurysms occurred in small or medium cavities, and caused fatal haemoptyses in 17 of the 26 patients.

Trauma as a cause of solitary peripheral pulmonary artery aneurysm has been reported in 5 cases.[6] Gunshot wounds were the most common type of trauma incriminated. Mycotic solitary pulmonary artery aneurysms may

occur in patients with congenital heart disease, or with recurrent infections or thrombophlebitis.[2]

Diagnosis

The diagnosis of peripheral pulmonary artery aneurysm should be considered in a patient with a chest roentgenogram showing a solitary pulmonary shadow.

The clinical presentation will vary according to the aetiology described. A systolic murmur over the site of the shadow is suggestive. Chest fluoroscopy may show pulsation, and tomograms may demonstrate the vascular connection of the shadow. A pulmonary arteriogram clinches the diagnosis. The slow emptying of contrast medium from the aneurysm, as described in our case, is typical and owing to the inelastic properties of the aneurysm wall.[2] The pulmonary arteriogram should demonstrate the presence of multiple pulmonary aneurysms, if they are present.

Treatment

A high incidence of fatal rupture has been reported for solitary peripheral pulmonary artery aneurysms. Out of 35 patients, 21 died from rupture.[2] Treatment of choice consists of the removal of the lobe in which the aneurysm is situated.

Our case is the eighth to be reported for which a successful resection has been performed.

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